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June 20, 1992

Dr. Alvin M. Goodman
Office of Naval Research
Code 1114
800 North Quincy Street
Arlington, Virginia 22217-5000

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JUL 06 1992
S A D

Re: Progress Report for Contract No. N00014-91-J-1840
"Isotopically Enriched (28)Si Crystal for Electronics Applications"

Dear Al:

What follows is the progress report for the above referenced project.

I) PROGRESS

- 1) After many attempts to purchase the highly enriched (28)Si source necessary for the experiment, we finally obtained approximately 10 grams of (28)Si pellets from Interlab, Little Neck, NY. in May. It turned out that Atomergic Chemicals Corp., which originally promised to deliver the material, was never able to fulfill the order.
- 2) Half of the (28)Si pellets that we acquired were sent to Professor Kang Wang at UCLA for MBE growth of the epitaxial films. Prof. Wang's group has expertise for MBE growth of Si and Ge epitaxial layers, and is scheduled to do the first runs in the next couple of weeks. The initial plan for TI (Dr. Bruce Gnade) to grow the MBE (28)Si epitaxial films was recently dropped, after their preliminary attempts using small quantities of Si source failed (they are equipped to do Si MBE out of a much larger Si source).
- 3) We have designed and fabricated the sample holder for thermal conductivity measurements of the Si(28) epitaxial films.
- 4) We have designed and fabricated the mask set for making the test structures on the Si(28) epitaxial wafers.
- 5) We have fabricated some test structures on regular Si epitaxial wafers, and preliminary experiments are underway to measure the thermal conductivity of these samples.

II) PLANS FOR THE NEXT 6-MONTH PERIOD

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- 1) Establish MBE Si growth parameters and demonstrate high quality epitaxial Si films using normal Si source (in Prof. K. Wang's lab).
- 2) MBE growth of Si(28) films based on the parameters established in 1). (in Prof. K. Wang's lab).
- 3) Conduct a series of experiments on regular Si epitaxial wafers to optimize the thermal conductivity measurements.
- 4) Modify the mask set and test apparatus if necessary, depending on the results of the measurements.
- 5) Fabricate sample devices on Si(28) epi-films for thermal conductivity measurements.
- 6) Measure thermal conductivity of Si(28) epi-films, and analyze results.

Please let me know if you need additional information. I can be reached by phone (203/432-4211), fax (203/432-7769), or e-mail (ma@venus.ycc.yale.edu).

Sincerely yours,



Tso-Ping Ma
Professor

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Statement A per telecon Alvin Goodman
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